

WHAT IS CLAIMED IS:

- 1        1.        A method for interfacing with a printer driver, comprising:
  - 2            receiving data transmitted from the printer driver;
  - 3            receiving an acknowledgment request from the printer driver, wherein the printer
  - 4            driver does not send further data to print until receiving an acknowledgment reply
  - 5            indicating that the transmitted data passed an initial check;
  - 6            transmitting an acknowledgment reply to the printer driver in response to the
  - 7            acknowledgment request before completing the initial check of the sent data to cause the
  - 8            printer driver to send further data;
  - 9            resynchronizing data processing operations in response to detecting an error in the
  - 10          received data; and
  - 11          rasterizing and outputting the data.
- 1        2.        The method of claim 1, wherein the received data comprises a first
- 2        received data set, further comprising receiving a second data set from the printer driver
- 3        after transmitting the acknowledgment reply and before completing the rasterization of
- 4        the first data set.
- 1        3.        The method of claim 2, wherein each received data set comprises a page of
- 2        data, a portion of a page or commands to output.
- 1        4.        The method of claim 2, further comprising:
  - 2            buffering the second data set while the first data set is being rasterized; and
  - 3            rasterizing the buffered second data set after completing the rasterization of the
  - 4            first data set.

1       5.     The method of claim 2, further comprising:  
2           concurrently rasterizing the first and second data sets with two rasterizers to  
3           rasterize in parallel the two data sets.

1       6.     The method of claim 1, wherein the initial check is to verify that the data  
2     was received, accepted and syntax checked.

1       7.     The method of claim 1, wherein resynchronizing data precessing  
2     operations in response to detecting the error further comprises:  
3           detecting an error while processing the received data;  
4           transmitting a negative acknowledgment indicating an error that causes the printer  
5     driver to resend previously transmitted data that did not output successfully; and  
6           wherein after transmitting the negative acknowledgment, performing:  
7              (i) receiving data and one acknowledgment request;  
8              (ii) performing the initial check of the received data;  
9              (iii) determining whether the received data is resent data; and  
10             (iv) if the received data is resent data, then transmitting an  
11             acknowledgment reply to the printer driver in response to the acknowledgment  
12             request after completing the initial check of the resent data.

1       8.     The method of claim 7, wherein the received data comprises a page of  
2     data, wherein after transmitting the negative acknowledgment, further performing:  
3           if the received page is not a resent page, then transmitting an acknowledgment  
4     reply to the printer driver in response to the acknowledgment request before completing  
5     the initial check of the sent data to cause the printer driver to send further pages.

1           9.       The method of claim 8, wherein after transmitting the negative  
2 acknowledgment, further performing:  
3               incrementing a counter if the received page is not a resent page;  
4               determining whether the counter exceeds a threshold;  
5               wherein if the received page is not a resent page, then, if the counter does not  
6 exceed the threshold, transmitting the acknowledgment reply to the printer driver after  
7 completing the initial check of the page and if the counter does exceed the threshold, then  
8 transmitting the acknowledgment reply to the printer driver before completing the initial  
9 check of the page.

1           10.      The method of claim 1, wherein transmitting the acknowledgment reply to  
2 the printer driver in response to the acknowledgment request before completing the initial  
3 check of the sent data comprises an asynchronous processing mode, and wherein  
4 resynchronizing data processing operations in response to detecting the error comprises  
5 beginning a synchronous processing mode wherein the acknowledgment reply is sent to  
6 the printer driver in response to the acknowledgment request after completing the initial  
7 check of the resent data.

1           11.      A system for interfacing with a printer driver, comprising:  
2               means for receiving data transmitted from the printer driver;  
3               means for receiving an acknowledgment request from the printer driver, wherein  
4 the printer driver does not send further data to print until receiving an acknowledgment  
5 reply indicating that the transmitted data passed an initial check;  
6               means for transmitting an acknowledgment reply to the printer driver in response  
7 to the acknowledgment request before completing the initial check of the sent data to  
8 cause the printer driver to send further data;

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9           means for resynchronizing data processing operations in response to detecting an  
10    error in the received data; and  
11    means for rasterizing and outputting the data.

1           12.    The system of claim 11, wherein the received data comprises a first  
2    received data set, further comprising means for receiving a second data set from the  
3    printer driver after transmitting the acknowledgment reply and before completing the  
4    rasterization of the first data set.

1           13.    The system of claim 12, wherein each received data set comprises a page  
2    of data, a portion of a page or commands to output.

1           14.    The system of claim 12, further comprising:  
2           means for buffering the second data set while the first data set is being rasterized;  
3    and  
4           means for rasterizing the buffered second data set after completing the  
5    rasterization of the first data set.

1           15.    The system of claim 12, further comprising:  
2           means for concurrently rasterizing the first and second data sets with two  
3    rasterizers to rasterize in parallel the two data sets.

1           16.    The system of claim 11, wherein the initial check is to verify that the data  
2    was received, accepted and syntax checked.

1           17.    The system of claim 11,  
2           wherein the means for resynchronizing data precessing operations in response to  
3    detecting the error further comprises:

4 (i) detecting an error while processing the received data;

5 (ii) transmitting a negative acknowledgment indicating an error that causes

6 the printer driver to resend previously transmitted data that did not output

7 successfully; and

8 means for performing, after transmitting the negative acknowledgment:

9 (i) receiving data and one acknowledgment request;

10 (ii) performing the initial check of the received data;

11 (iii) determining whether the received data is resent data; and

12 (iv) if the received data is resent data, then transmitting an

13 acknowledgment reply to the printer driver in response to the acknowledgment

14 request after completing the initial check of the resent data.

1           18.    The system of claim 17, wherein the received data comprises a page of  
2 data, further comprising means for performing after transmitting the negative  
3 acknowledgment:

- 4           if the received page is not a resent page, then transmitting an acknowledgment
- 5    reply to the printer driver in response to the acknowledgment request before completing
- 6    the initial check of the sent data to cause the printer driver to send further pages.

- 1        19. The system of claim 18, further comprising means for performing, after
- 2 transmitting the negative acknowledgment:
  - 3        incrementing a counter if the received page is not a resent page;
  - 4        determining whether the counter exceeds a threshold;
  - 5        wherein if the received page is not a resent page, then, if the counter does not
  - 6 exceed the threshold, transmitting the acknowledgment reply to the printer driver after
  - 7 completing the initial check of the page and if the counter does exceed the threshold, then
  - 8 transmitting the acknowledgment reply to the printer driver before completing the initial
  - 9 check of the page.

1        20.    The system of claim 11, wherein the means for transmitting the  
2 acknowledgment reply to the printer driver in response to the acknowledgment request  
3 before completing the initial check of the sent data comprises an asynchronous processing  
4 mode, and wherein the means for resynchronizing data processing operations in response  
5 to detecting the error comprises beginning a synchronous processing mode wherein the  
6 acknowledgment reply is sent to the printer driver in response to the acknowledgment  
7 request after completing the initial check of the resent data.

1        21.    An article of manufacture for interfacing with a printer driver, wherein the  
2 article of manufacture comprises code implemented in a computer readable medium to  
3 cause a processor to perform:

4            receiving data transmitted from the printer driver;  
5            receiving an acknowledgment request from the printer driver, wherein the printer  
6 driver does not send further data to print until receiving an acknowledgment reply  
7 indicating that the transmitted data passed an initial check;  
8            transmitting an acknowledgment reply to the printer driver in response to the  
9 acknowledgment request before completing the initial check of the sent data to cause the  
10 printer driver to send further data;  
11            resynchronizing data processing operations in response to detecting an error in the  
12 received data; and  
13            rasterizing and outputting the data.

1        22.    The article of manufacture of claim 21, wherein the received data  
2 comprises a first received data set, wherein the code is further capable of causing the  
3 processor to perform receiving a second data set from the printer driver after transmitting  
4 the acknowledgment reply and before completing the rasterization of the first data set.

1        23.    The article of manufacture of claim 21, wherein each received data set  
2    comprises a page of data, a portion of a page or commands to output.

1        24.    The article of manufacture of claim 22, wherein the code is further capable  
2    of causing the processor to perform:  
3            buffering the second data set while the first data set is being rasterized; and  
4            rasterizing the buffered second data set after completing the rasterization of the  
5    first data set.

1        25.    The article of manufacture of claim 22, wherein the code is further capable  
2    of causing the processor to perform:  
3            concurrently rasterizing the first and second data sets with two rasterizers to  
4    rasterize in parallel the two data sets.

1        26.    The article of manufacture of claim 21, wherein the initial check is to  
2    verify that the data was received, accepted and syntax checked.

1        27.    The article of manufacture of claim 21, wherein resynchronizing data  
2    precessing operations in response to detecting the error further comprises:  
3            detecting an error while processing the received data;  
4            transmitting a negative acknowledgment indicating an error that causes the printer  
5    driver to resend previously transmitted data that did not output successfully; and  
6            wherein after transmitting the negative acknowledgment the code is further  
7    capable of causing the processor to perform:  
8                (i) receiving data and one acknowledgment request;  
9                (ii) performing the initial check of the received data;  
10               (iii) determining whether the received data is resent data; and

11 (iv) if the received data is resent data, then transmitting an  
12 acknowledgment reply to the printer driver in response to the acknowledgment  
13 request after completing the initial check of the resent data.

1           28. The article of manufacture of claim 27, wherein the received data  
2   comprises a page of data, wherein after transmitting the negative acknowledgment,  
3   further performing:

- 4           if the received page is not a resent page, then transmitting an acknowledgment
- 5        reply to the printer driver in response to the acknowledgment request before completing
- 6        the initial check of the sent data to cause the printer driver to send further pages.

1        29. The article of manufacture of claim 28, wherein the code is further capable  
2 of causing the processor to perform after transmitting the negative acknowledgment:  
3                incrementing a counter if the received page is not a resent page;  
4                determining whether the counter exceeds a threshold;  
5                wherein if the received page is not a resent page, then, if the counter does not  
6 exceed the threshold, transmitting the acknowledgment reply to the printer driver after  
7 completing the initial check of the page and if the counter does exceed the threshold, then  
8 transmitting the acknowledgment reply to the printer driver before completing the initial  
9 check of the page.

1        30. The article of manufacture of claim 21, wherein transmitting the  
2 acknowledgment reply to the printer driver in response to the acknowledgment request  
3 before completing the initial check of the sent data comprises an asynchronous processing  
4 mode, and wherein resynchronizing data processing operations in response to detecting  
5 the error comprises beginning a synchronous processing mode wherein the  
6 acknowledgment reply is sent to the printer driver in response to the acknowledgment  
7 request after completing the initial check of the resent data.